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NUTRITION

PROGRAM NEWS

U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

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NOV 23 1973

PROCUREMENT SECTION
CURRENT AFFAIRS

4p. JULY/AUG 1973

JULY-AUGUST 1973

Vegetarian Diets *nutrition*

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In recent years, there has been an increase in the number of individuals who subscribe to vegetarian diets, particularly among young people. Many readers have questioned the adequacy of some of these diets. This issue of Nutrition Program News reports vegetarian diets of various kinds, their nutritional adequacy, and the implications for nutrition education.

What is a vegetarian diet?

To many people, a vegetarian diet is one that does not contain meat, poultry, or fish. However, vegetarian diets differ in the kinds of foods that they contain. They usually include some or all of the following foods—vegetables, fruits, enriched or whole grain breads and cereals, dry beans and peas, lentils, nuts and nut-like seeds, peanuts, and peanut butter. They may also include other foods, but some diets are more strict than others in the foods permitted: For example:

- *A pure or strict vegetarian diet.* This diet excludes all foods of animal origin—meat, poultry, fish, eggs, and dairy products such as milk, cheese, and ice cream.
- *An ovo-lacto-vegetarian diet.* This diet includes eggs and dairy products, but excludes meat, poultry, and fish.
- *A lacto-vegetarian diet.* This diet includes dairy products, but excludes meat, poultry, fish, and eggs.

Are vegetarian diets nutritionally sound?

Some of them are. A vegetarian diet—like more traditional ones—can meet nutrient needs if foods are selected wisely. However, some vegetarian diets—for example, the higher levels of the Zen macrobiotic diet—are dangerous, because food selection is so restricted that the diet becomes severely inadequate in nutrients. Others, particularly if they contain foods of animal origin, such as milk, other dairy products, and eggs, can be nutritionally acceptable.

Are there certain kinds of foods that should be included in vegetarian diets? If so, why are they important?

Vegetarian diets—like more traditional ones—need to include a variety of foods. This will help to safeguard getting the nutrients needed for growth and health. Foods are made up of different nutrients—proteins, carbohydrates, fats, minerals, and vitamins. Foods vary in the kinds and amounts of nutrients that they contain. Most provide more than one nutrient, but no single food furnishes all the nutrients in the amounts required for good health. Thus, eating an assortment of foods is important.

It's a good idea to select foods daily from each of the following groups:

- Dry beans, dry peas, lentils, nuts and nut-like seeds. Among foods of vegetable origin, these foods are valued for their protein. As a group, they also supply iron, thiamin, riboflavin, niacin, and other nutrients, but vary in amounts provided by a serving.
- Whole grain and enriched breads and cereals. Foods in this group provide worthwhile amounts of protein, iron, and several of the B-vitamins.
- Vegetables and fruits. Fruits and vegetables are valuable because of the vitamins and minerals that they contain. Some are especially good sources of vitamin C. Citrus fruits and strawberries are rich sources. Other dependable sources include cantaloup, honeydew melon, watermelon, asparagus, broccoli, brussels sprouts, cabbage, cauliflower, collards, garden cress, kale, kohlrabi, mustard greens, green and sweet red peppers, potatoes and sweetpotatoes cooked in the jacket, rutabaga, spinach, tomatoes, and turnip greens.

Dark-green and deep-yellow vegetables and deep-yellow fruits furnish important amounts of vitamin A. In addition, dark-green leafy vegetables are de-

pendable sources of a number of other nutrients. Fruits and vegetables also provide roughage, or fiber, which promotes motility and health of the gastrointestinal tract.

- Milk and milk products (especially for children and pregnant and nursing women), eggs. Milk provides calcium, protein, riboflavin, vitamin A (if the milk is whole or fortified), vitamin B₁₂, and other nutrients. Cheese, ice cream, and ice milk supply these nutrients, too, but in different proportions. In addition, milk may be fortified with vitamin D, making it a reliable source of this vitamin.

Eggs are a good source of many of the same nutrients found in milk, although calcium is a notable exception. They are also a worthwhile source of iron, found only in trace amounts in milk.

In addition to the foods listed above, other foods may be used in meals. These foods include sugar or other sweeteners; table fats, other fats, and oils, including salad dressings; and unenriched refined breads, cereals, flours, and meals. Often, these are ingredients in a recipe or are added to other foods during preparation or at the table. Although a number of these foods provide some protein, minerals, vitamins, or essential fatty acids, the main contribution of the listed foods is often food energy (calories).

Are there some nutrients that are more likely than others to be short in vegetarian diets?

Yes, especially in a pure vegetarian diet. These are:

- Vitamin B₁₂. This vitamin is found only in foods of animal origin—meat, fish, eggs, and dairy products. It is not believed to occur in foods of vegetable origin. This means that a person eating a pure vegetarian diet will need to take a vitamin preparation containing this vitamin or to include vitamin B₁₂ fortified foods in his diet—for example some breakfast cereals have this vitamin added.

Vitamin B₁₂ is essential for normal blood cell formation and for normal functioning of nerves. A deficiency of this vitamin may cause nerve damage to strict vegetarians. Symptoms may take years to appear in some persons, but may appear in a much shorter time in others. For some unknown reason, anemia usually does not develop.

- Calcium. Milk is the leading source of calcium. Unless milk in some form is included in the diet, it is difficult to get enough calcium. Certain dark-green leafy vegetables—collards, dandelion greens, kale, mustard greens, and turnip greens—are worthwhile sources of calcium. Some other foods that supply valuable amounts include broccoli, spoon cabbage, okra, rutabaga, some legumes (particularly soybeans), most dried fruits, and certain nuts (especially al-

monds). However, dried fruits and nuts usually do not contribute substantial amounts to the diet, because they are likely to be eaten only in small quantities.

If milk and milk products are omitted from the diet, daily use of these better vegetable sources of calcium is essential. However, children and pregnant and lactating women should include milk in their diet if at all possible, because their need for calcium is relatively greater than the needs of other persons.

Calcium is required for the formation of strong bones and teeth, for the clotting of blood, and for the normal functioning of muscles and nerves.

- Vitamin D. This vitamin occurs naturally in worthwhile amounts in only a few foods, and these are all foods of animal origin—egg yolk, butter, liver, and fish such as sardines, salmon, herring, and tuna. However, milk is often fortified with vitamin D. Other foods such as margarine and breakfast cereal may also have vitamin D added to them. Another source is the vitamin D formed by the action of sunlight on the skin.

If all food sources of vitamin D are eliminated from the diet, use of a vitamin preparation or of fish liver oils may be advisable, particularly for infants, young children, pregnant and nursing women, and for persons who seldom get out of doors and into the sunlight. However, care must be taken in the use of vitamin preparations and fish liver oils, because excessive amounts of vitamin D can be toxic.

Vitamin D helps the body to use calcium and phosphorus, and thus is important for the normal development of bones and teeth.

- Possibly riboflavin. Milk and meat are among the best sources of riboflavin. When milk is excluded from the diet, getting enough riboflavin—like getting enough calcium—may become a problem. Obtaining an adequate supply becomes even more difficult when both milk and meat are omitted. Dried yeast, a rich source of riboflavin, can be added to foods to increase the amount of riboflavin provided.¹ Eggs, if eaten, are also a dependable source.

Green leafy vegetables, asparagus, broccoli, brussels sprouts, okra, and winter squash provide more riboflavin than do most other vegetables. Legumes contribute fair amounts. Some nuts and seeds contain worthwhile amounts, but because they are usually eaten in relatively small quantities, may not contribute much riboflavin. On the other hand, whole grain and

¹ Active baker's yeast, such as that used in baking, should not be eaten directly. However, cooking or heating inactivates the yeast and makes it suitable for use.

enriched breads and cereals, whose riboflavin content is comparatively small, will provide significant amounts in the diet if eaten several times daily.

- Possibly iodine. Foods grown in soils away from the seacoast are sometimes deficient in iodine. A lack of this mineral can cause goiter, a swelling of the thyroid gland. The use of iodized table salt is a practical way to be sure of getting enough iodine in the diet.

Is getting enough protein likely to be a problem?

Getting enough protein in a vegetarian diet is usually not a problem for adults. However, obtaining adequate amounts may be difficult for children, particularly young children, if milk in some form is not a part of their diet.

Important amounts of protein are found in dry beans, dry peas, lentils, and nuts, and nut-like seeds. Bread, cereals, vegetables, and fruits contain smaller amounts. However, the quantity of bread—and perhaps of cereal—eaten daily may be large enough to make these foods important sources.

Are proteins from vegetable sources as good as proteins from animal sources?

Foods of both animal and vegetable origin provide protein. However, proteins differ in quality, because they differ in the kinds and amounts of amino acids (the building blocks of protein) that they contain. Proteins from animal muscle, milk, and eggs are rated highest, because they supply amino acids in about the same proportions in which they are needed by the body. The proteins from fruits, vegetables, grains, and nuts supply important amounts of many amino acids, but they do not provide as good an assortment as animal proteins do. However, the proteins from some legumes, particularly soybeans and chickpeas, are almost as good as those from animal sources.

Combining a small amount of animal protein with cereal and vegetable proteins helps to improve protein quality. Examples of nourishing combinations are cereal with milk or macaroni with cheese.

Foods of vegetable origin can also be combined to improve protein quality. Knowing how to do this takes special knowledge if only a few foods are eaten. A rough guide to follow is to combine legumes and cereals, such as beans with corn, beans with rice, and peanuts with wheat. These food combinations do not need to be prepared together and eaten as a mixture to get the benefit of an improvement in protein quality, but they do need to be eaten at the same meal. Some seed and legume proteins combine well, for example, soybeans and sesame seeds. Nevertheless, to safeguard protein quality, it is a good idea to have a variety of sources of vegetable protein at a meal.

What are meat analogs? Do they have the same food value as meat?

Meat analogs are simulated meat products. They are made from vegetable protein sources and are textured and flavored to resemble meats such as beef, ham, chicken, and fish. The most common vegetable protein source used in these products is the soybean.

Meat analogs currently on the market may not be equivalent in nutritive value to the meats that they resemble—either in protein quality or in their vitamin and mineral content. However, the U.S. Food and Drug Administration is developing guidelines that will require analogs to provide nutrient levels at least as high as those of the meat that they are intended to replace.

These products are suitable for use by persons who omit meat from their diets. However, some of these items contain egg white or nonfat dry milk and, therefore, would not be appropriate if egg or milk is to be omitted, such as in the pure or strict vegetarian diet. Check the ingredient list on the label of the meat analog to see what it contains.

How can a vegetarian combine foods into satisfactory meals?

The menu below shows how foods can be combined into pleasing and nutritious meals for a day for an adult male on a strict vegetarian diet. Foods from the food groups mentioned on pages 1 and 2, except for milk and eggs, have been included. In addition, a source of vitamin B₁₂ and possibly of iodine is needed.

Breakfast

Orange	1 medium
Bulgur	1 cup
with brewer's yeast	1 tablespoon
Toasted wheat-soy bread	1 slice
with honey	1 tablespoon

Morning Snack

Shelled almonds	1/4 cup
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Lunch

Split pea soup	2 cups
Peanut butter sandwich:	
Peanut butter	2 tablespoons
Whole wheat bread	2 slices
Honey	1 tablespoon
Fruit-sunflower seed salad:	
Apple	1/2 medium
Banana	1/2 medium
Sunflower seeds	1/4 cup
Lettuce	1 leaf

Afternoon Snack

Peach	1 medium
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Dinner

Soybeans	1 cup
Brown rice cooked	1 cup
fried in oil	2 tablespoons
with chestnuts	2 tablespoons
with sesame seeds	2 tablespoons
Collards	1 cup
Pear	1 medium

Evening Snack

Raisins	1/4 cup
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The volume of food required to meet energy and nutrient needs may be greater with a vegetarian diet than with a traditional diet. This is because many foods of animal origin are more concentrated sources of energy and certain nutrients than are foods of vegetable origin, and when these are omitted from the diet, a larger quantity of food is needed to replace them. Eating large quantities of food may be particularly difficult for young children. This is another reason for including milk and other foods of animal origin in a child's diet, if at all possible.

Although foods such as fats, oils, sugars, and sweeteners are good sources of energy, their use in a vegetarian diet may need to be curtailed in order to achieve a well-balanced diet. As mentioned earlier, their nutritional contribution in relation to number of calories supplied is often quite small.

Implications for Educators

Some vegetarians simply omit meat, poultry, and fish from their diets, because they object to killing animal life for a source of food. If they are willing to use eggs, milk, and milk products, it will be easier to help them upgrade their often limited diets.

Several points to emphasize:

1. The greater the variety of fruits, vegetables, cereals, legumes, nuts, and selected seeds that are eaten along with eggs and milk (and milk products), the better are the chances that the individual will get a good or at least an improved assortment of nutrients. Variety, however, does not assure an adequate diet.
2. It is necessary to eat larger quantities of food in order to get desirable amounts of various nutrients.
3. Just as with the ordinary mixed diet, intakes of sugars and fats should be moderate.

Vegetarians who do not include eggs and/or milk or milk products present a much more difficult problem, not only because of the added restrictions, but also because ethical or religious beliefs are often involved and present a limited potential for modification. For these individuals to select really good diets for themselves requires more knowledge of food composition than the average individual is likely to have.

As educators, we must accept the restrictions that the individual has imposed on himself and do all we can to motivate him to include in his diet the greatest possible variety of the kinds of foods he is willing to accept in quantities that have a potential for upgrading his diet. We can help him to (1) appreciate his nutritional needs, (2) understand how well or how poorly his choices are satisfying those needs, and (3) make selections that will improve the situation. After that, he will make his choices, and he will live with the consequences—good or bad.